I have assumed the intensity of light on June 13 = 1.

The orbit of the comet makes a very close approach to that of the planet Venus. My last elements indicate for least distance of orbits . . 0·011.

For calculation of places after July 15 the following expressions for the comet's heliocentric co-ordinates referred to the equator, will be useful, in conjunction with X, Y, Z, of the *Nautical Almanac*.

$$x = r\,[9{\cdot}77492] \sin (v + 26^\circ\ 8'{\cdot}5)$$
$$y = r\,[9{\cdot}98665] \sin (v + 276^\circ\ 17'{\cdot}1)$$
$$z = r\,[9{\cdot}92408] \sin (v + 176^\circ\ 54'{\cdot}5)$$

J. R. HIND

Mr. Bishop's Observatory, Twickenham, June 23

The following additional information is taken from a letter by Mr. Hind in yesterday's *Times* :—

"The comet will be nearest to the earth on the night of July 22, its distance being then less than 0·3.

"Last night at 11.30, the moon being yet above the horizon, the comet appeared to be in the least degree fainter than the star Upsilon, Ursæ Majoris, which Argelander estimates rather higher than the fourth magnitude. In the strongly illuminated sky of these midsummer nights it was very sensibly brighter than the neighbouring stars 42 and 43 Camelopardi. By measures of the nucleus taken with the filar-micrometer, it appeared to be rather more than 4,000 miles in diameter, and the tail, assuming it to be projected from the nucleus in the line of the radius-vector, would be 4,000,000 miles in length.

"During the first fortnight in July the comet will undoubtedly be a pretty conspicuous object in the constellation Lynx, where there are few bright stars.

"At the end of September its brightness, by theory, should be the same as on the night of discovery (April 17), and it will then be well observed in the southern hemisphere, in the neighbourhood of the star Alpha Chamæleontis."

MR. HIND, in a letter with which he has favoured me, lays great stress upon the star-like appearance of the nucleus of the comet now visible, as seen in a telecope ; and M. Rayet has already, in a communication to the Paris Academy, shown that its spectrum is continuous, that of the coma giving the three ordinary cometary bands. On Monday evening last the comet was bright enough, in spite of the moonlight, to enable me to observe this continuous spectrum with my 6¼ inch Cooke and a pocket spectroscope. It struck me that the spectrum was short, *i.e.* that it was deficient in blue rays ; and as one saw in the telescope a fan-like structure above the nucleus (as seen in an inverting telescope), so also in the spectroscope, the continuous spectrum sparkled as if many short bright lines or bands were superposed upon it. I shall be glad to learn that other observers with more powerful instruments have had their attention directed to these two points.

J. NORMAN LOCKYER

NOTES

ON the 3rd inst. the corner stone of the American Museum of Natural History in New York was laid by the President of the United States. The ground belonging to the Museum measures about eighteen acres, and the building when completed according to plan will be larger than the British Museum. The object of the Museum is twofold :—First to interest and instruct the masses ; and secondly, and specially, to render all possible assistance to specialists. The library presented to the Museum by Miss Wolfe, with a large collection of shells, also donated by Miss Wolfe to the Museum in memory of her father, who was its first President, was purchased by her at a cost of 35,000 dols. The other collections at present in the temporary Museum are valued at 250,000 dols. A rare and newly complete series of American birds, and many fine birds of Paradise and pheasants, now in the collection formerly belonging to Mr. D. G. Elliott, will be added. The Trustees have purchased the collection of Prince Maximilian, of Neuwied, on the Rhine, and a large number of specimens belonging to the late Edward Verreaux, of Paris. Large donations of shells, corals, and minerals, have been received, as also a collection of 20,000 insects. The collections will be bought and cared for by moneys contributed by the Trustees individually and the public, but the building now in progress will be erected at the expense of the city, which has already appropriated 500,000 dols. for this purpose.

Prof. Joseph Henry of the Smithsonian Institution gave an address on the above occasion, in which he spoke as follows on the necessity of endowing scientific research :—"The development of the institution would not be completed were it furnished with all the appliances I have mentioned. There is another duty which this city owes to itself and to the civilisation of the world. I allude to an endowment for the support of a college of discoverers and a number of men capable not only of expounding established and known truths, but of interrogating nature and discovering new facts, new phenomena, and new principles. The blindness of the public to the value of the abstract sciences and the matter of endowments of colleges for their support is remarkable. It is not everyone, however well educated he may be, that is capable of becoming a first-class scientist. Like poets, discoverers are born, not made, and when one of this class has been found he should be cherished, liberally provided with the means of subsistence, fully supplied with all the implements of information, and his life consecrated to the high and holy office of penetrating the mysteries of nature. What has been achieved in the knowledge of the forces in operation in nature, and the uses to which it is applied in controlling and directing these forces to useful purposes, constitutes the highest claim to the glory of our race.'

THE Duke of Devonshire, speaking at the banquet at Trinity College, Cambridge, on the 17th inst., said it had fallen to his lot during the last three or four years, while acting on a Royal Commission for inquiring into Scientific Education and the Advancement of Science, to become acquainted with the development and extension of scientific teaching in the several Universities of the kingdom, and of learning the views of those best qualified to express an opinion as to the requirements remaining to be supplied. The result of the inquiry had been satisfactory, inasmuch as it showed that a great deal had been done in the direction indicated, and that University authorities had manifested a strong desire that the Universities should be provided with all appliances necessary not only for centres of scientific education, but as centres also of general intellectual activity and of original research. This latter point was strongly insisted on in the evidence before the commissioners, and received their concurrence. A University which recognised the advancement and extension of knowledge as one of the main purposes of its existence was surely to be regarded as of a higher and nobler type than one which was satisfied with the position of a mere educational body. There was nothing antagonistic in these two objects ; on the contrary, great advantage might be derived from their combination.

THE Emperor of Austria has been pleased to confer upon Mr. Robert H. Scott, F.R.S., the Director of the Meteorological Office, the Order of the Iron Crown, Third Class.

DR. TOLOZAN, physician to the Shah of Persia, has been elected a corresponding member of the French Academy in the section of Medicine and Surgery, and M. Studer of Berne in that of Geology. The latter is a veteran of 79 years.

THE organisation of the French National Observatory will very soon be complete, *Les Mondes* says. The French Government have voted 30,000 francs to the meteorological department, and M. Le Verrier is about to resume the work of international meteorology, with the fixed intention of abandoning local meteorology to the departmental observatory of Mont-Souris. M. Le Verrier is at present in this country, having come over to get his Cambridge degree conferred. He is to visit Newcastle, to inspect Mr. Newall's large telescope, and Edinburgh and Glasgow in connection with meteorology. The printing has been begun of a very large catalogue of stars observed at the Paris Observatory. MM. Fizeau and Cornu are measuring anew the speed of light under conditions which encourage us to look for a definite result.

THERE will be ample opportunities for practical work in Natural Science during the long vacation (July and August) at Cambridge. The laboratories of Experimental Physics, of Chemistry and Physiology, will be open, and the professors, or the demonstrators, or both, will be in attendance to give assistance to students. Prof. Newton has given notice of a practical class for Comparative Anatomy; and Prof. Humphry has given notice of a practical class for Human Anatomy (more particularly Osteology), and also for Histology.

THE Rev. S. J. Perry, the head of the expedition sent out by the Admiralty to observe the transit of Venus, together with Lieut. Coke, R.N., Paymaster Brown, R.N., and the Rev. W. Sidgreaves, were among the passengers by the steamer *Windsor Castle*, which left Dartmouth on Tuesday for the Cape of Good Hope.

THE *conversazione* of the Society of Arts held in the South Kensington Museum last Friday was a great success. It is said there were about 3,500 guests present.

AT the annual meeting of the Palestine Exploration Fund, Lieut. Conder, R.E. (officer in charge of the survey of Palestine), described the work of the expedition. Before leaving Palestine he had completed half the map, and it was expected that within four years, instead of eight, the whole of Palestine would have been surveyed. There were now 300 square miles added to the map, being five times the result at first expected to be accomplished.

THE discovery of a new planet by Mr. Perrotin, of Toulouse, is announced.

AT the half-yearly meeting of the Highland and Agricultural Society of Scotland, a long discussion took place in reference to the filling up of the vacancy in the chemical department, as also on the proposal for granting bursaries with a view to the encouragement of agricultural education throughout the country. It was ultimately agreed to remit the matter back to the directors, with instructions to inquire as to the amount of funds that could be placed at their disposal for the educational and chemical departments. A motion for memorialising Government on the propriety of establishing agriculture as a branch of the system of physical science taught under the superintendence of the Department of Science and Art, and proposing that the Society offer a premium for the best text-book for such a course, was adopted.

IN reliance on the receipt of further subscriptions to prosecute the Sub-Wealden Exploration, it has been decided to continue the boring to a farther depth of 200 ft. The hon. secretary has offered to become personally responsible to the Diamond Rock Boring Company for the cost of the extra 200 ft. His offer has been accepted, and he has been requested to issue another appeal for subscriptions. In doing so he urges upon "all who like to be considered generous, enlightened, wise, and good, to vie with each other in contributing to complete this the first boring for scientific purposes in England."

AT the Anniversary Meeting of the Royal Geographical Society on Monday it was stated that there had been an increase of 342 new membering and 9 honorary corresponding members; the Society now numbers 2,900 Fellows. In accordance with the announcement already made, the Founder's Gold Medal was presented to Dr. Georg Schweinfurth, in whose absence it was received for him by the German Ambassador Count Münster; and the Victoria (or Patron's) Gold Medal, which had been awarded to Col. P. Egerton Warburton, for his journey across the previously unknown part of Western Australia, was received by his nephew, Mr. Bateman. Mr. Francis Galton, F.R.S., then introduced the successful competitors for the annual geographical medals. A gold medal for physical geography was awarded to Louis Weston (City of London School), and a bronze medal for the same subject to Francis Charles Montague (University College School). For political geography, a gold medal was gained by W. H. Turton (Clifton College, Bristol), and a bronze medal by Lionel Jacob (City of London School). The president, Sir Bartle Frere, then delivered his address on the progress of geography, and announced as his successor in the presidential chair, Major-Gen. Sir Henry C. Rawlinson, K.C.B. Medals were also given to Chumah and Susi, two of Livingstone's black servants, who brought his MSS. to England. The Rev. H. Waller stated they were of invaluable aid to Mr. T. Livingstone in editing the MSS., both from their accurate knowledge of the country and their intelligent comprehension of the maps. At the anniversary dinner in the evening, among those who were present and who spoke were M. Leverrier and Chief-Justice Daley, President of the American Geographical Society.

THE fourth part of Tryon's "American Marine Conchology" has made its appearance, with eight coloured plates, and embracing the family of the *Chitonidæ*, of which six species are indicated, the orders *Opisthobranchiata* and *Pteropoda*, the commencement of the class *Acephala*, beginning with the *Pholadidæ*. The work was commenced early in 1873, and if it be confined to the five or six parts originally proposed, will soon be brought to a completion.

AT the annual distribution of the prizes in connection with the Newcastle College of Physical Science, on the 17th inst., the address of the Dean was, on the whole, very hopeful. The number of students has not greatly increased, but the quality of the work done has advanced considerably. We regret to see that the evening classes have not been so great a success as was hoped; but we hope the professors will not be easily induced to discontinue them, but will take every means to let their advantages be known to the young men of the district. During the past year the facilities of the college for imparting knowledge has been very much increased. The laboratory has been extended; a large and valuable collection of minerals has been added to Dr. Page's museum; and several expensive instruments have also been added to Mr. Herschel's collection. It is hoped that very soon a Chair of Biology will be established in the University. Arrangements have been made by which the degree of B.Sc. will be conferred on any deserving student by the University of Durham; and we are glad to see that the requirements for this degree have been made very considerable. Arrangements have also been made by which the college will be fully represented in the Senate of Durham.

A GEOLOGISTS' FIELD CLUB was instituted at Halifax at the close of the University lectures (Cambridge extension scheme) last April. The excursions which had been made from time to time with Mr. Sollas, B.A., made the students wishful to keep them up; hence the formation of a club which numbers about ninety members. The proceedings are reported in the local papers, and judging from the programme sent us the club means to go in for hard and earnest, and we hope fruitful, field-work.

IT gives us much pleasure to see from a recent number of the *Dunstable Borough Gazette* that that paper devotes a fair amount of space to science, under the title of "Our Science Column." The number before us, June 17, contains a good popular article on the value of scientific knowledge, some meteorological data, and an original communication on the botany of Dunstable, being the continuation of a list of plants of the district, with their common and scientific names. We hope the editor will continue his science column, and make it a means of enlightening his readers, and that the number of provincial papers which have a "Science Column" may go on rapidly increasing.

THE *Gardeners' Chronicle* learns that a committee has been formed, and funds are being collected, for the much needed restoration of Selborne Church as a memorial to Gilbert White. It is also proposed to erect a Cross to his memory on the "Plestor." It is hoped that a sufficient sum will be raised, beyond what will be required for these objects, to found an exhibition to one of the colleges at Oxford, with which he was connected, to be called the "Gilbert White" Exhibition. It is calculated that at least 5,000*l*. will be required. The committee includes the names of the Right Hon. Lord Selborne, the President and Fellows of Magdalen College, Oxon; Prof. Bell, F.R.S., &c.; the Rev. F. Parsons, Vicar of Selborne, and others.

AT a special meeting of the Anthropological Institute, to be held at Bethnal Green Museum, on July 1, Col. Lane Fox will give an Address on the principles of classification in his anthropological collection.

DR. LEA has added another volume to his large work on the Unionidæ, illustrated by twenty-two lithographic plates.

A PROPOSAL has been made in the *American Chemist* that a centenary meeting should be held on August 1 to commemorate the discovery of oxygen by Priestley on August 1, 1774. The *American Journal of Science and Arts* points out that this would afford an opportunity to discuss interesting chemical topics and to review the progress made during the century.

ON Wednesday the 17th the President of the Geological Society held an inaugural reception of the Fellows in their new apartments at Burlington House, to which many ladies were also invited. Although the meeting-room has been in use for a few weeks, and the removal of the library from Somerset House has been completed, the removal of the museum has but just commenced, and as the collections are so extensive it will occupy many weeks.

THE Statistical Society will hold its Fortieth Anniversary Meeting on Tuesday, June 30, at 3.30 P.M.

A PROJECT has been set on foot to provide Bridlington Quay with a marine aquarium. It is estimated the work will cost about 5,000*l*., towards which several gentlemen in the locality have promised to subscribe. The affair will probably take the shape of a limited liability company.

THE additions to the Zoological Society's Gardens during the last week include two Huanacos (*Lama huanaco*) and a Patagonian Cavy (*Dolichotis patachonica*) from Patagonia, presented by Mr. W. G. Parry; a Common Racoon (*Procyon lotor*) from North America, presented by Mr. T. Taylor; a Bonnet Monkey (*Macacus radiatus*) from India, presented by Mr. Wood; two Blue-cheeked Barbets (*Magalæma asiatica*) and two White Cranes (*Grus leucogeranos*) from India; a Honey Buzzard (*Pernis apivorus*), European, purchased; a Malay Tapir (*Tapirus indica*) from Malacca, deposited.

CONFERENCE FOR MARITIME METEOROLOGY

THE Sub-committee for Maritime Meteorology appointed by the Permanent Committee of the Vienna Congress have determined to hold a private conference on the subject in London, to commence on Aug. 31. The meetings will be held, by permission of the meteorological committee, at the Meteorological Office, 116, Victoria Street, London, S.W. The invitations are to be issued this week, and the following is the Programme of Questions to be discussed. I may say that I have already received replies to the circular respecting the Brussels Conference from all the countries to which it was addressed.

ROBERT H. SCOTT,
Secretary to the Sub-Committee

A general wish has of late been expressed that the measures for the prosecution of Maritime Meteorology proposed at the International Conference at Brussels in 1853 should be reconsidered, now that the experience of more than twenty years of the operation of these measures has enabled meteorologists to form opinions as to their utility.

At the Meteorological Conference at Leipsig in 1872, and again at the International Congress at Vienna in 1873, preliminary discussions took place on the subject of the more successful prosecution of Ocean Meteorology. Certain resolutions were adopted at Leipsig and confirmed at Vienna, and accordingly it seems proper to embody them in the present programme. They run as follows:—

"1. Thorough uniformity in methods and instruments should be aimed at in the same measure as for observations on shore. This will be most satisfactorily obtained by the chiefs of the central institutes—the establishment of which in all countries in which they do not already exist, and in which the maritime interests demand them, must be declared as absolutely necessary—entering into relations with each other and agreeing on the separate details, the construction of the instruments, the hours of observation, the journal, &c.

"2. Unity of measures and scales is desirable, and to this end the introduction of millimetres for the barometer and the centigrade scale for the thermometer should be aimed at. While, however, the comparison of standard instruments of the individual central stations must be insisted on, the uniformity of scales is at present only declared as desirable.

"3. The Committee would urge the importance of the co-operation of the navies, inasmuch as by their assistance, and by the opportunities afforded thereby of completeness in certain observations, the determination of factors and constants is rendered possible, which can be used with advantage for the reduction of certain results derived from the general system of observations.

"4. With reference to the utilisation of the results, the Committee would urge similarly the importance of uniformity in the methods employed. In close relation therewith was the carrying out of the division of labour of the central stations of the individual states. This principle must be recognised as of the greatest importance for the further development of Marine Meteorology. The repetition of work over definite regions, with reference to the area to be investigated, must be declared as indefensible in the interests of this development."

It was further resolved—"That the convening of a Maritime Meteorological Conference is desirable."

While accepting the above resolutions as a general expression of the principles which should form the basis of an agreement as to future operations in the field of Ocean Meteorology, the Sub-Committee to whom the negotiations preparatory to the assembling of a Conference have been entrusted, consider that it is advisable to enter more minutely into the details, and have accordingly agreed on the following series of questions:—

In the case of a nation which sent any representative to the Brussels Conference in 1853, a circular should be addressed to the chief of the Office for Maritime Meteorology, if such exist, or to the chief of the meteorological organisation of the country, requesting him to state:—

1. To what extent the resolutions adopted at Brussels have been carried out in this country?
2. What have been the grounds for departure from them, if such departure has taken place?

and to send his reply to the Secretary to the Sub-Committee, Mr. Robert H. Scott, 116, Victoria Street, London, S.W.,